

**THAT WHICH IS CLAIMED IS:**

1. A separator comprising:

a vessel having an inside wall;

at least one fractionation tray disposed within said vessel, said at least one fractionation tray including a bottom tray;

vapor delivery means operably related in fluid flow communication with said vessel for delivering vapor to said vessel at a spatial location below said bottom tray; and

liquid removal means operably related in fluid flow communication with said bottom tray and said vessel for removing accumulated liquid on said bottom tray from said vessel.

2. A separator in accordance with claim 1 wherein said vapor delivery means comprises a conduit having an outside surface, a first open end and a second open end, wherein said first open end opens within said vessel below said bottom tray and wherein said second open end extends through an opening in said inside wall of said vessel, said outside surface of said conduit being in sealing engagement with said opening in said inside wall of said vessel.

3. A separator in accordance with claim 1 wherein said bottom tray is further characterized to include a top surface and at least one downcomer

extending downwardly from said top surface for removal of said accumulated liquid from said bottom tray; and

5                    wherein said liquid removal means comprises a conduit having an outside surface, a first end and a second end, wherein said first end is connected in fluid flow communication with said at least one downcomer and said second end extends through an opening in said inside wall of said vessel, said outside surface of said conduit being in sealing engagement with said opening in said inside wall of said vessel.

4.    A separator in accordance with claim 3 wherein said at least one downcomer and said conduit are substantially sealed off from fluid flow communication with said vapor delivery means.

5.    A separator in accordance with claim 1 wherein said bottom tray further comprises passageways, wherein said vapor passes up through said passageways, and wherein said liquid accumulated on said bottom tray substantially does not pass through said passageways.

6.    A separator in accordance with claim 1 wherein said vapor delivery means is substantially sealed off from fluid flow communication with said liquid removal means.

7.    A separator in accordance with claim 1 further characterized to include reboiler means operably connected in fluid flow communication with

said vapor delivery means and with said liquid removal means for reboiling  
said accumulated liquid removed from said bottom tray by said liquid removal  
5 means to form said vapor for delivery to said vessel through said vapor delivery  
means.

8. A separator in accordance with claim 7 wherein said liquid  
removal means is configured in order to provide said accumulated liquid to said  
reboiler means at a liquid head which extends vertically to a level in the range  
of from said reboiler means inlet up to the level of said bottom tray.

9. A separator in accordance with claim 7 wherein said reboiler  
means is a thermosiphon type reboiler.

10. A separator in accordance with claim 9 wherein said liquid  
head of said accumulated liquid provides for natural circulation of said  
accumulated liquid from said separator to said reboiler means and back to said  
separator as said vapor.

11. A process for reboiling liquid in a separator comprising:  
accumulating a liquid on a bottom tray of said separator;  
overflowing said liquid from said bottom tray into at least one  
downcomer thereby forming an overflow liquid stream;  
5 removing said overflow liquid stream from said at least one  
downcomer and said separator;

heating at least a portion of said overflow liquid stream thereby forming a vapor; and

introducing said vapor into said separator at a spatial location below said bottom tray.

12. A process in accordance with claim 11 wherein substantially all of said liquid overflowing from said bottom tray is collected in said at least one downcomer.

13. A process in accordance with claim 11 wherein all of said liquid overflowing from said bottom tray is collected in said at least one downcomer.

14. A process in accordance with claim 11 wherein said vapor passes up through passageways in said bottom tray, and wherein said liquid accumulated on said bottom tray is substantially kept from passing down through said passageways.

15. A process in accordance with claim 11 wherein said overflow liquid stream is substantially sealed off from fluid flow communication with said vapor introduced into said separator.

16. A process in accordance with claim 11 wherein said heating of said at least a portion of said overflow liquid stream is in reboiler means for reboiling liquid, and wherein the liquid level in said downcomer supplying said

overflow liquid stream to said reboiler means is above said spatial location

where said vapor is introduced into said separator.

17. A process for maximizing the liquid head to reboiler means for reboiling liquid of a separator comprising:

accumulating a liquid on a bottom tray of said separator;

overflowing at least a portion of said liquid from said bottom tray

into at least one downcomer thereby forming an overflow liquid stream;

passing said overflow liquid stream from said at least one downcomer to said reboiler means;

vaporizing at least a portion of said overflow liquid stream in said reboiler means thereby forming a vapor;

passing said vapor from said reboiler means to said separator at a spatial location below said bottom tray; and

wherein the liquid head of said overflow liquid stream to said reboiler means is in the range of from the level of the reboiler means up to the level where said liquid overflows from said bottom tray into said at least one downcomer.

18. A process in accordance with claim 17 wherein substantially all of said liquid overflowing from said bottom tray is collected in said at least one downcomer.

19. A process in accordance with claim 17 wherein all of said liquid overflowing from said bottom tray is collected in said at least one downcomer.

20. A process in accordance with claim 17 wherein said vapor passes up through passageways in said bottom tray, and wherein said liquid accumulated on said bottom tray is substantially kept from passing down through said passageways.

21. A process in accordance with claim 17 wherein said overflow liquid stream is substantially sealed off from fluid flow communication with said vapor passed from said reboiler means to said separator.

22. A process in accordance with claim 17 wherein said reboiler means uses steam to heat said overflow liquid stream.

23. A process in accordance with claim 22 wherein said reboiler means is a thermosiphon type reboiler.

24. A process in accordance with claim 23 wherein said liquid head of said overflow liquid stream provides for natural circulation of said overflow liquid stream from said separator to said reboiler means and back to said separator as said vapor.